



Smoking behaviors and intentions among adolescents in rural China: The application of the Theory of Planned Behavior and the role of social influence



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HIGHLIGHTS

- This study examined factors associated with smoking among adolescents in rural China.
- Attitudes, peer influence and subjective norms were associated with ever smoking.
- Attitudes, peer influence and perceived control were related to regular smoking.
- Attitudes, peer influence and perceived control were related to current smoking.
- Attitudes, peer influence and perceived control were related to smoking intention.

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ABSTRACT

Introduction: This study investigated the associations between the variables of the theory of planned behavior (TPB), influence of significant others, and smoking intentions and behaviors among adolescents living in rural southern China.

Methods: A cross-sectional study was conducted among 2609 students in two junior high schools in rural Shantou, Guangdong province, using a self-administered questionnaire. Logistic regression models were fitted to estimate univariate and adjusted odds ratios and corresponding 95% confidence intervals.

Results: Multivariate analyses showed that having favorable attitudes towards smoking on psychological and social aspects, perceived behavioral control, and having most friends who were current smokers were significantly associated with smoking intentions in the next six months and in the next five years. Having most family members who were current smokers was also significantly related to smoking intention in the next five years. Having favorable attitudes towards smoking on psychological aspect and negative attitudes on physical aspect, perceived support from friends on smoking, and having most friends and senior relatives being current smokers were significantly associated with increased likelihood of ever smoking. Perceived behavioral control and having most friends being current smokers were also significantly associated with regular smoking and smoking in the past 30 days.

Conclusions: Our results suggest that the key constructs of the TPB model and friends' smoking behaviors play important roles in accounting for smoking intentions and behaviors among a sample of rural Chinese adolescents.

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1. Introduction

It is estimated that there were 301 million smokers in China (Li, Hsia, & Yang, 2011), which consist of one third of all smokers worldwide

(Eriksen, Mackay, & Ross, 2012). As of 2010, the prevalence of current smoking was 52.9% among males and 2.4% among females in China (Li et al., 2011). The country has the largest number (over one million in 2005) of people dying from smoking-related diseases (Yang & Hu, 2011). By 2030, 3.54 million adults aged 40 years or above in China will die from smoking-related diseases (Yang & Hu, 2011). In a national survey conducted in cities in China, the prevalence of life-time smoking was 22.4% among male middle school and college students and 3.9%

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among female students (Ji, Chen, & Song, 2009). A lower age of onset for smoking has also been observed in China (Yang & Hu, 2011). This trend is consequential, as those who start smoking in early adolescence are more likely than others to become regular smokers in the future (Pierce & Gilpin, 1996).

Higher prevalence of ever smoking was reported in rural areas than in urban areas in Zhejiang province (Hesketh, Ding, & Tomkins, 2001). However, the reverse trend was observed in Shanghai (Cai et al., 2012). Urban girls were consistently found to have higher smoking rates than rural girls (Ma et al., 2008; Yang et al., 2004). Although several anti-smoking interventions had targeted students in urban China (Chou et al., 2006; Wen et al., 2010), no similar intervention has been found among rural adolescents. It is therefore important to identify factors associated with smoking among rural adolescents so that tailored interventions can be designed.

The Theory of Planned Behavior (TPB) is commonly used in health behavior research. It states that individuals' attitudes toward a health-related behavior (cognitive and affective evaluations of that behavior), subjective norms (perceptions of significant others' approval of that behavior), and perceived behavioral control (perceived competence to perform that behavior) determine their behavioral intentions, which leads to the performance of the behavior (Glanz, Rimer, & Viswanath, 2008). In particular, Ajzen (Ajzen, 2002) proposed that perceived behavioral control is comprised of two components: self-efficacy (the ease or difficulty of performing a behavior) and controllability (the extent to which the performance is up to the actor). The theory has been able to predict smoking onset in a number of cross-sectional and longitudinal studies targeting adolescents in some western countries (Grube, Morgan, & McGree, 1986; Harakeh, Scholte, Vermulst, de Vries, & Engels, 2004; O'Callaghan, Callan, & Baglioni, 1999). However, performance of behavioral theories varies across cultural contexts (Godin et al., 1996). It is unclear whether it is applicable to understand smoking among adolescents in the Chinese context. Research is warranted as there is only one such study in China (Guo et al., 2007), which covered only urban and not rural adolescents.

Social influences are as important as cognitive factors in determining adolescent smoking behavior. According to the Social Cognitive Theory, a behavior is learnt through the observation of the behavior of others (Bandura, 2001). Parents' and friends' smoking behaviors are moderately to strongly associated with onset of smoking among adolescents (Cohen, Richardson, & LaBree, 1994; Flay et al., 1994; Unger et al., 2002). Adolescents in rural China are surrounded by adult smokers, as 56.1% of the adult men in rural China are smokers (Li et al., 2011). Being surrounded by adult smokers is shown to be associated with adolescent smoking initiation (Gilman et al., 2009). Adolescence is characterized by a critical period for physical and psychosocial development, and social influence is said to be particularly important for their formation of identity and behaviors (Gifford-Smith, Dodge, Dishion, & McCord, 2005). Therefore, it is assumed that peer influence will exert a significant influence on smoking over and above the beliefs that one may hold onto the behavior. It is expected that social influence will contribute to the prediction of behavioral intention independently of the TPB variables.

This study investigated the prevalence of ever-smokers, current smokers and regular smokers, and intention to smoke in the next six months and five years among junior secondary school students in rural southern China. The timeframe of six months and five years was chosen as we wish to tap participants' intention to smoke in both the short and long term future. In particular, as a national study in China reported that the average age of smoking initiation was 19 years old among Chinese men (Yang et al., 1999), we specifically asked participants' intention to smoke in the coming five years (which is about 5 years from their current age). The intention to smoke in the coming five years has been measured in previous studies on adolescent smoking (Wakefield et al., 2004; 2. United States Department of Health & Human Services (USDHHS) (USDHHS), 1994), and it has been shown that

intention of smoking in five years is a reliable predictor of future smoking behavior (Wakefield et al., 2004). We tested the hypothesis that factors derived from the TPB and proportions of significant others being current smokers were significantly associated with the dependent variables related to smoking. We tested an additional hypothesis that TPB-related variables and proportions of significant others' current smoking variables were independently associated with smoking.

2. Methods

2.1. Study design and participants

A cross-sectional survey was conducted in November 2009. The study participants came from two junior high schools in Liangying County of rural Shantou in Guangdong province. With an area of 72.4 km² and a population of about 200 thousand living in 70 villages (Bureau of Statistics of Liangying Township, 2011), Liangying has a relatively high living standard and is classified as the second class out of the four classes of rural China (from very affluent to very poor). In 2009, the annual income per capita in Liangying was 5210 RMB, higher than the national average of 4140 RMB for rural areas in China but close to the mean of Guangdong Province (Bureau of Statistics of Liangying Township, 2011; National Bureau of Statistics of China, 2010). There were more than 10,000 students studying in 10 junior high schools in Liangying in the 2009/2010 academic year. Out of the 10 schools, two, which represented the average to above average academic performance level, were selected. These two schools belonged to the same school district and had similar facilities, number of students and smoking-related policies. Therefore, the influence of these structural variables on smoking was comparable.

An invitation letter was sent to the school principals, and both schools agreed to participate. Graduate students who majored in public health in the Shantou University assisted with the survey questionnaire administration. Before data collection, standard training was provided for the survey administrators to ensure the quality of the survey and to reduce the between-person variation. A structured and self-administered questionnaire was administered in classroom settings in the absence of teachers. All students in Grades 7–9 were invited to join the study and 2609 students, representing a response rate of 93.4%, completed the survey. The survey was anonymous and confidentiality was ensured. Written informed consent was obtained from their parents in advance. This study was approved by the Survey and Behavioral Research Ethics Committee of the Chinese University of Hong Kong (CRE-2009.507-T).

2.2. Measures

2.2.1. Socio-demographic characteristics

Information collected included age, sex, school, grade, average pocket money received per day (none, ≤ 1.99 RMB, 2–4.99 RMB, or ≥ 5 RMB; \$1US = 6.06 RMB), and other socio-demographic characteristics.

2.2.2. Smoking-related dependent variables

Questions were asked to assess lifetime history of smoking (ever-smoking, "Have you ever tried smoking cigarettes, even one puff or two?" (no/yes)) and regular smoking ("Have you smoked cigarettes at least once a week for three months or more consecutively, previously or currently?") with 3 categories (no, previously yes but not now, currently yes). Similar definitions of ever smoking and regular smoking have been used in other studies (Dierker, Avenevoli, Goldberg, & Glantz, 2004; Fuemmeler, Kollins, & McClernon, 2007). Current smoking was defined as "ever smoked in the past 30 days". Participants' intentions to smoke in the future were assessed by two questions: "Do you think you will smoke in the coming six months?" and "Do you think you will smoke in the next five years?" with 4 options ('definitely no', 'probably no', 'probably yes', and 'definitely yes') (Gao et al., 2010).

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